

[5254]-661

**B.E. (Computer Engineering)**  
**DESIGN & ANALYSIS OF ALGORITHMS**  
**(2012 Pattern)**

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6, Q. 7 or Q. 8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

**Q1) a)** Find an optimal solution for the following instance using job sequencing with scheduling: Number of jobs  $n = 4$ , profits = (100, 27, 15, 10), deadlines = (2, 1, 2, 1) [6]

**b)** Define asymptotic notations. Explain their significance in analyzing algorithms. [6]

**c)** Explain backtracking algorithm with graph coloring problem. [8]  
 OR

**Q2) a)** With respect to dynamic programming, explain in brief the following: [6]

i) Optimal Substructure.

ii) Overlapping Subproblem.

**b)** State Recursive Relation for Binary Search and solve them using Master Theorem. [6]

**c)** Write the algorithm for m-coloring graph using backtracking strategy And also analyze the time complexity for the same. [8]

**Q3) a)** State Vertex Cover Problem and prove that Vertex Cover Problem is NP Complete. [8]

**b)** What is deterministic and non deterministic algorithm? Explain with example. [8]

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OR

**Q4) a)** Explain the concept of Randomized algorithm and Approximation algorithm in brief with example. [8]

**b)** Explain in brief NP complete problem. Prove that the 3-SAT problem is NP-complete. [8]

**Q5) a)** Explain in brief how parallel algorithm can be used for finding shortest paths of a given graph. [8]

**b)** Explain Concurrent Algorithms for Dining philosopher's problem. [8]

OR

**Q6) a)** When the parallel algorithms are "work optimal"? Explain performance parameters for parallel algorithms. [8]

**b)** Explain in detail parallel algorithm with example. [8]

**Q7) a)** What is election algorithm in distributed system? Explain Bully algorithm with example. [9]

**b)** Explain Buddy memory algorithm to allocate memory. [9]

OR

**Q8) a)** Explain in detail KMP algorithm. [9]

**b)** Write Short note on: [9]

i) Data management algorithms and clustering.

ii) Cryptography algorithms.

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